Remarks

Applicants note with appreciation the Examiner's indication that claims 3, 15, and 16 define allowable subject matter. Applicants also thank the Examiner for granting Applicants a telephonic interview on June 17, 2002. Claims 3, 15, and 16 have been rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1-13, 15 and 16 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In response to this rejection, Applicants have amended claims 1-11 and 13-16 to more particularly point out and distinctly claim Applicants invention. Applicants have amended claim 1 to remove the phrase "a first desired effect" and instead refer to "controlling engine idle". Applicants have amended claim 11 to remove the phrase "first set of operating conditions" and "second set of operating conditions" and instead refer to the "battery state of charge exceeds a maximum desired level or the generator fails" and "battery state of charge is below a predetermined level and no generator failure", respectively. Applicants have amended claims 15-16 to remove "the step of selectively" because this is an unnecessary limitations and to more particularly point out what Applicants regard as the invention.

Claims 1-14 were stated in paragraph no. 3 to stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Severinsky (Patent No. 6,209,672) in view of Schoch et al. (Patent No. 5,261,291) and further in view of Kubota et al. (Patent No. 6,351,698). Claims 3, and 15-16 were stated in paragraph no. 4 to be allowable if rewritten in independent form which has been done as noted above. There is no motivation to combine these three references, and even if the references are combined, the combination fails to teach "method for controlling idle speed of an engine within a hybrid electric vehicle" as recited by Applicants in claim 1. It is Applicants' understanding that the Examiner applies Severinsky as modified by Kubota against claims 6 and 9, and Severinsky as modified by Schoch against

claim 4. As to the remainder of these claims the only reference relied upon by the Examiner appears to be Severinsky.

Severinsky teaches a hybrid electric vehicle with a "microprocessor responsive to the vehicle's mode of operation" (column 12, lines 6-65), to improve hybrid electric vehicle performance (column 11, lines 32-35), while in a dynamic state, i.e., low speed operation and highway cruising (column 13, line 41 and column 15, line 6, respectively). Severinsky fails to describe or suggest controlling idle speed of an engine in a hybrid electric vehicle. Severinsky never even addresses **engine idle operation** when vehicle is stopped.

The Examiner also states in paragraph no. 3 that Severinsky teaches "an adaptive fuel table requires HEV-fast adaptive learning", column 20, line 25 of Severinsky. However, column 20, line 25 of Severinsky states "wherein positive mechanical connection is made between the shafts" which does not teach HEV-fast adaptive learning. Also, the Examiner states that Severinsky teaches "the controller produce the first effect, when the engine temperature is below a predetermined engine temperature", citing column 5, lines 55-68. However, column 5, lines 55-68 of Severinsky reads:

> The art also suggests using both when maximum torque is required. In several cases the electric motor drives one set of wheels and the internal combustion engine drives a different set. See generally Shea (4,180,138); Fields et al. (4,351,405); Kenyon (4,438,342); Krohling (4,593,779); and Ellers (4,923,025).
>
> Many of these patents show hybrid vehicle drives wherein a variable speed transmission is required, as do numerous additional references. A transmission as noted above is typically required where the internal combustion engine and/or the electric motor are not capable of supplying sufficient torque at low speeds. See Rosen (3,791,473); Rosen (4,269,280); Fiala (4,400,997); and Wu et al. (4,697,660).

Severinsky fails to teach how engine temperature is used to control engine idle as claimed in Applicants invention. Therefore, Applicants feel that Severinsky fails to teach or suggest the invention claimed in claims 1-3, 5-8, and 10-16.

Regarding the proposed combination of Severinsky and Kubota to reject claims 6 and 9, Kubota merely teaches an interactive navigation vehicle control system (column 1, lines 5-19). The Examiner states Kubota teaches "a system control for a learned adaptive fuel table for a current driving mode and condition"(column 5, line 15). However, in Kubota column 5, lines 14-18 states "the conditions inside of the vehicle include current condition of devices and instruments equipped in or on the vehicle such as engine, automatic transmission, navigation system, audio units, air conditioner, wiper, windows, etc." Kubota fails to teach a vehicle system controller **to control engine idle**. Furthermore, Kubota lacks any teaching or suggestion regarding "when an adaptive fuel table requires HEV-fast adaptive learning" as stated in Applicants' claim 6. Kubota teaches air conditioner operation as an in vehicle condition, but does not teach how this vehicle condition is used to help control the engine or vehicle system during idle conditions, as stated in Applicants' claim 9.

Regarding the proposed combination of Severinsky and Schoch to reject claim 4, Schoch discloses a vertical control stick that is used to ergonomically control a vehicle providing acceleration, brake and turn functions (column 1, lines 55-58). The Examiner states Schoch discloses "a control system for vehicle comprising; a vacuum brake booster controlled by a controller to produce the first desired effect when a vacuum level in a brake system reservoir is below a predetermined brake system vacuum level." Schoch discloses a vertical control stick connected to a shaft that drives a vacuum brake booster unit for producing brake pressure for a hydraulic braking system to provide deceleration (column 5, lines 4-7). Schoch fails to disclose or suggest "activating the vehicle system controller to control the generator to control engine idle when a vacuum level in a brake system reservoir is below a predetermined brake system vacuum level" as recited by Applicants in claim 4.

Applicants have attempted to place this case in condition for allowance by the above amendments to the claims of this application. Applicants respectfully request the Examiner to contact Applicants' undersigned attorney if it would advance the prosecution of this application. Applicants request reconsideration of the application in view of the above amendments and remarks, and respectfully request that the Examiner pass this case to issue.

Respectfully submitted,

Stephen John Kotre et al.

By _____

Kevin J. Heinl
Reg. No. 29,805
Attorney/Agent for Applicant

Date: June 19, 2002

BROOKS & KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075
Phone: 248-358-4400
Fax: 248-358-3351

Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Claims

1. (amended) A method for controlling idle speed of an engine [within] in a hybrid electric vehicle including a generator [having a rotor assembly which] that is operatively coupled to the engine, [said] the method comprising [the steps of]:

determining whether a [first] set of vehicle idle entry conditions [are met, wherein said first set of vehicle idle entry conditions comprises] comprising whether the vehicle is below a predetermined maximum idle speed and whether an accelerator is below a predetermined minimum pedal position;

[scheduling a desired engine brake torque and] selectively activating a vehicle system controller to control [said] the generator [and producing a first desired effect] to control engine idle when a predetermined first set of operating conditions is present;

selectively activating an engine controller to control engine idle speed when a predetermined second set of operating conditions is present; and

turning off the engine when [said] the predetermined first set of conditions is not present and when the engine has been in a current vehicle idle mode for a predetermined amount of time.

2. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desire effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when a state of charge of a battery is below predetermined battery minimum state of charge.

3. (amended) [The method of claim 1, wherein the step of scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desired effect when the first set of operating conditions

is present comprises the step of scheduling the desired engine brake torque and] A method for controlling idle speed of an engine in a hybrid electric vehicle including a generator that is operatively coupled to the engine and climate control reservoir, the method comprising:

determining whether a first set of vehicle idle entry conditions comprising whether the vehicle is below a predetermined maximum idle speed and whether an accelerator is below a predetermined minimum pedal position;

selectively activating a vehicle system controller to control the generator to control engine idle when a predetermined first set of operating conditions is present;

selectively activating an engine controller to control engine idle speed when a predetermined second set of operating conditions is present; and

turning off the engine when the predetermined first set of conditions is not present and when the engine has been in a current vehicle idle mode for a predetermined amount of time; and

selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when a vacuum level in a climate control reservoir is below a predetermined minimum climate control vacuum level.

4. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when a vacuum level in a brake system reservoir is below a predetermined brake system vacuum level.

5. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first

desired effect] control engine idle when a vapor canister contained within a fuel system requires purging.

6. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when an adaptive fuel table requires HEV-fast adaptive learning.

7. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle and engine temperature when the engine has cooled below a predetermined engine temperature.

8. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when a catalyst has cooled below a predetermined minimum catalyst temperature.

9. (amended) The method of claim 1, wherein the step of [scheduling the desired engine brake torque and selectively activating the vehicle system controller to control said generator and producing the first desired effect when the first set of operating conditions is present comprises the step of scheduling the desired engine brake torque and] selectively

activating the vehicle system controller to control [said] the generator to [produce the first desired effect] control engine idle when air conditioning has been requested by a vehicle operator.

10. (amended) The method of claim 1, wherein the step of selectively activating the engine controller to control engine idle speed [when the second set of operating conditions is present comprises the step of selectively activating the engine controller to control engine idle speed] when:

the generator has failed; or

a battery state of charge exceeds a maximum desired level.

11. (amended) A hybrid electric vehicle including a generator having a rotor assembly which is operatively coupled to an engine, the hybrid electric vehicle comprising:

a vehicle system controller for controlling idle speed of the engine when [a first set of operating conditions is present at a scheduled engine brake torque to produce a desired result] the battery state of charge exceeds a maximum desired level or the generator fails; and

an engine controller for controlling the idle speed of the engine when [a second set of operating conditions is present] the battery state of charge is below a predetermined level and no generator failure.

13. (amended) The hybrid electric vehicle of claim 11, wherein [said] the second set of operating conditions is selected from a group consisting of a high battery state of charge and a failed generator.

14. (amended) A method for controlling idle speed of an engine [within] in a hybrid electric vehicle [including] having a generator [having a rotor assembly which] that is operatively coupled to the engine, [said] the method comprising [the steps of]:

determining whether a [first] set of vehicle idle entry conditions [are met, wherein said first set of vehicle idle entry conditions comprises] comprising whether the vehicle is below a predetermined maximum idle speed and whether an accelerator is below a predetermined minimum pedal position are met;

[scheduling a desired engine brake torque and] selectively activating a vehicle system controller to control [said] the generator [and producing a first desired effect] to control engine idle when a first set of operating conditions [are] comprising: a low battery state of charge, a low climate control vacuum level, a low brake system reservoir vacuum level, a high fuel tank pressure, the existence of a minimum time period since a last vapor canister purging, the existence of current vapor canister purging, the existence of a learned adaptive fuel table for the current driving mode, a low engine temperature, a low catalyst temperature, and the state of activation of an air conditioning switch;

selectively activating an engine controller to control engine idle speed when a second set of operating conditions is present; and

turning off the engine when [said] the first set of operating conditions is not present and when the engine has been in a current vehicle idle mode for a predetermined amount of time, otherwise maintaining [said] the current vehicle idle mode.

15. (amended) [The method of claim 14, wherein the step of selectively activating the engine controller to control engine idle speed when the second set of operating conditions is present comprises the step of] A method for controlling idle speed of an engine in a hybrid electric vehicle having a generator that is operatively coupled to the engine, the method comprising:

determining whether a set of vehicle idle entry conditions comprising whether the vehicle is below a predetermined maximum idle speed and whether an accelerator is below a predetermined minimum pedal position are met;

selectively activating a vehicle system controller to control the generator and producing a first desired effect when a first set of operating conditions exist;

selectively activating an engine controller to control engine idle speed when a second set of operating conditions is present;

turning off the engine when the first set of operating conditions is not present and when the engine has been in a current vehicle idle mode for a predetermined amount of time, otherwise maintaining the current vehicle idle mode; and

selectively activating the engine controller to control engine idle speed when the generator has failed.

16. (amended) [The method of claim 14, wherein the step of selectively activating the engine controller to control engine idle speed when the second set of operating conditions is present comprises the step of] A method for controlling idle speed of an engine in a hybrid electric vehicle having a generator that is operatively coupled to the engine, the method comprising:

determining whether a set of vehicle idle entry conditions comprising whether the vehicle is below a predetermined maximum idle speed and whether an accelerator is below a predetermined minimum pedal position are met;

selectively activating a vehicle system controller to control the generator to control engine idle when a first set of operating conditions exist;

selectively activating an engine controller to control engine idle speed when a second set of operating conditions is present;

turning off the engine when the first set of operating conditions is not present and when the engine has been in a current vehicle idle mode for a predetermined amount of time, otherwise maintaining the current vehicle idle mode; and

selectively activating the engine controller to control engine idle speed when a battery state of charge exceeds a maximum desired level.